

REMARKS

The Office Action of December 27, 2006 has been received and its contents carefully considered.

The present application is directed to an integrated circuit that includes logic circuits and a testing arrangement for testing the logic circuits. In Figure 1 of the application's drawings, logic circuits alternate with scan registers in two parallel scan chains (although more scan chains may be used; see Figure 3). Using multiple scan chains while logic circuits are tested shortens the time needed for testing, since the logic circuits can be tested in parallel. During normal operation of the arrangement shown in Figure 1, though, the situation is different. As Figure 1 shows, input data DI supplied to the first logic circuit 11 in the upper chain and the output of the upper chain is supplied to the first logic circuit 15 in the lower chain. That is, the logic circuits of both chains are cascaded during normal operation (see passage at page 11, lines 6-15, or the passage at page 14, lines 7-16 for the more general arrangement shown in Figure 3).

The present Amendment revises the independent claims so as to include the operational mode of Applicant's integrated circuit in addition to the test mode. The revisions are supported by Figures 1 and 3 of the application's drawings and the above-noted passages of the specification describing the operational mode.

The Office Action rejects the claims for obviousness based on US patent 6,242,269 to Whetsel in view of US patent 6,169,500 Eriksson et al (hereafter simply "Eriksson" for the sake of convenient discussion). For the reasons discussed below,

however, it is respectfully submitted that the inventions now defined by independent claims 1 and 7 are patentable over these references.

Claim 1 now provides generally that logic circuits and scan registers are “connected alternately in series to form m scan chains” and that the scan chains themselves are “connected to one another in a sequence.” A serial/parallel conversion circuit converts serial test input data that is supplied during the test mode into parallel test input data that is “fed in parallel to the scan chains.” However, during the operational mode, claim 1 now provides that “operation input data is supplied to the sequence of scan chains via the input terminal of the first logic circuit in a first one of the scan chains.” A flip-flop that is recited in the claims “outputs processed operation input data from the sequence of scan chains during the operation mode.” Independent claim 7 has been amended in a similar manner.

Although the Whetsel reference shows parallel scan paths, and scan distributors/collectors PSC, the reference does not show the structure of the scan paths themselves. In particular, Whetsel neither discloses nor suggests that logic circuits are coupled in series via scan registers during normal operation but separated into parallel scan chains for testing. Nothing in Whetsel would suggest that Whetsel’s parallel scan paths are “connected to one another in a sequence” in the words of claim 1 or that “processed operation input data from the sequence of scan chains” is output during an operational mode.

Eriksson discloses serial/parallel and parallel/serial converters. The reference neither discloses nor suggests, however, that scan chains with logic circuits and scan

registers are connected to one another in a sequence. Or that processed operation input data from the sequence is produced during the operational mode. Accordingly, the Eriksson reference does not remedy the deficiencies in a Whetsel.

The Philips data sheet shows a parallel/serial converter, but Philips (like Eriksson) does not remedy the deficiencies of Whetsel.

The remaining claims depend from the independent claims discussed above and recite additional limitations to further define the invention, so they are patentable along with their independent claims and need not be further addressed.

For the foregoing reasons, it is respectfully submitted that this application is in condition for allowance. Reconsideration of the application is therefore respectfully requested.

Respectfully submitted,



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